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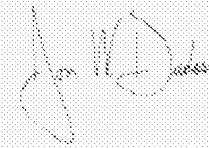
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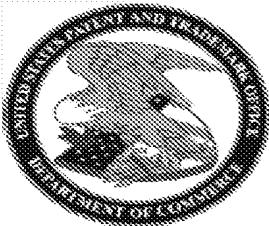
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INVENTOR(S)		
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<input checked="" type="checkbox"/> Additional inventors are being named on the 1 separately numbered sheets attached hereto		
TITLE OF THE INVENTION (500 characters max)		
OBJECT MODEL FOR MANAGING xDSL INTERFACES		
CORRESPONDENCE ADDRESS		
Direct all correspondence to:		
<input type="checkbox"/> Customer Number	<input type="text"/>	
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<input checked="" type="checkbox"/> Firm or Individual Name	Siemens Corporation	
Address	Intellectual Property Law Department	
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Country	USA	Telephone 732-321-3026
ZIP	08330	Fax 732-321-3014
ENCLOSED APPLICATION PARTS (check all that apply)		
<input type="checkbox"/> Specification Number of Pages	<input type="text"/>	<input type="checkbox"/> CD(s), Number <input type="text"/>
<input type="checkbox"/> Drawing(s) Number of Sheets	<input type="text"/>	<input checked="" type="checkbox"/> Other (specify) <input type="text"/> 50 PAGES OF COMBINED SPEC AND DRAWINGS
<input type="checkbox"/> Application Data Sheet. See 37 CFR 1.76		
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT		
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.		
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.		
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[Page 1 of 2]

Respectfully submitted,

SIGNATURE

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12/01/03

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42,360

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Docket Number:

2003P182361IS

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<p style="text-align: center;">INVENTOR(S)/APPLICANT(S)</p>		
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[Page 2 of 2]

Number 2 of 2

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Question(s):	2	Meeting, date:
Study Group:	15	Working Party: 1 Intended type of document (R-C-D-TD):
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<Contribution XXX>

G.omci.xdsl

Summary

This document provides ONT Management and Control Interface (OMCI) support for the Broadband Passive Optical Network (B-PON) system defined in ITU-T G.983.1 [1] for select functions which were out of the scope of ITU-T G.983.2 [2] and ITU-T G.983.8 [3]. OMCI support is specified for ONTs with ADSL and VDSL interfaces.

1 Scope

This document focuses on the OMCI specifications related to support for ONTs with ADSL and VDSL interfaces. Though the OMCI specifications are based on ITU-T G.983.2 [2] and ITU-T G.983.8 [3], some enhancements are needed. The scope of this Recommendation is limited to the enhancements only.

This document includes additions to sections of ITU-T G.983.2 [2] that pertain to these topics. As this document serves as an extension of ITU-T G.983.2 [2], all sections of that Recommendation remain pertinent.

2 References

The following ITU-T Recommendations and other references contain provisions that, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

- [1] ITU-T G.983.1 (1998), *Broadband optical access systems based on Passive Optical Networks (PON)*.
- [2] ITU-T G.983.2 (2002), *ONT management and control interface specification for ATM PON*.
- [3] ITU-T G.983.8 (2003), *B-PON OMCI support for IP, ISDN, Video, VLAN Tagging, VC Cross-Connections and other select functions*.

3 Abbreviations

This Recommendation uses the following abbreviations:

ANI	Access Network Interface
ADSL	Asymmetrical Digital Subscriber Line
ATU-C	ADSL Transceiver Unit, Central office end
ATU-R	ADSL Transceiver Unit, Remote Terminal End
B-PON	Broadband Passive Optical Network
DSL	Digital Subscriber Line
MAC	Media Access Control
ME	Managed Entity
MIB	Management Information Base
MMPDU	MAC Management Protocol Data Unit
MPDU	MAC Protocol Data Unit
MSDU	MAC Service Data Unit
OLT	Optical Line Terminal
OMCI	ONT Management and Control Interface
ONT	Optical Network Terminal
ONU	Optical Network Unit
PHY	Physical layer
PM	Performance Monitoring
RPD	Reverse Path Demodulator
SNR	Signal to Noise Ratio
UNI	User Network Interface
VDSL	Very High Speed DSL
VTU-Q	VDSL Transceiver Unit, ONU end (a.k.a. VTU-C)
VTU-R	VDSL Transceiver Unit, Remote Terminal end

4 Reference Model and Terms

See clause 4/G.983.2.

5 Requirements of the management interface specification

See clause 5/G.983.2.

5.1 Configuration management

See clause 5.1/G.983.2.

5.2 Fault management

The following performance management-related managed entities are added to the list given in clause 5.2/G.983.2.

- k) Physical Path Termination Point ADSL UNI
- j) Physical Path Termination Point VDSL UNI

5.3 Performance management

The following performance management-related managed entities are added to the list given in clause 5.3/G.983.2.

- p) ADSL ATU-C Performance Monitoring History Data
- q) ADSL ATU-R Performance Monitoring History Data
- r) ADSL ATU-C Channel Performance Monitoring History Data
- s) ADSL ATU-R Channel Performance Monitoring History Data
- t) VTU-O Physical Interface Monitoring History Data
- u) VTU-R Physical Interface Monitoring History Data
- v) VTU-O Channel Performance Monitoring History Data
- w) VTU-R Channel Performance Monitoring History Data

5.4 Security management

See clause 5.4/G.983.2.

6 Protocol-independent MIB for the OMCI

See clause 6/G.983.2.

6.1 Managed entities associated with xDSL interfaces

The managed entities in Table 1/G.omci.xdsl are defined in addition to the managed entities defined in Recommendation G.983.2.

Table 1/G.omci.xdsl Additional managed entities in the OMCI

Managed Entity	Required/Optional	Description
ADSL ATU-C Channel Data	CR	Contains the Channel Parameters for an ATU-C.
ADSL ATU-C Configuration Profile Part 1	CR	Parameters used to configure the ATU-C side of an ADSL line.
ADSL ATU-C Configuration Profile Part 2	CR	Parameters used to configure the ATU-C side of an ADSL line.
ADSL ATU-C Physical Data	CR	Contains the Physical Layer Parameters for an ATU-C.
ADSL ATU-R Channel Data	CR	Contains the Channel Parameters for an ATU-C.
ADSL ATU-R Configuration Profile Part 1	CR	Parameters used to configure the ATU-R side of an ADSL line.

Managed Entity	Required/Optional	Description
ADSL ATU-R Configuration Profile Part 2	CR	Parameters used to configure the ATU-C side of an ADSL line.
ADSL ATU-R Physical Data	CR	Contains the Physical Layer Parameters for an ATU-R.
ADSL ATU-C Channel Performance Monitoring History Data	O	Performance monitoring data for an ATU-C:ATU-R ADSL channel (from the ATU-R side)
ADSL ATU-C Performance Monitoring History Data	O	Performance monitoring data for an ATU-C:ATU-R modem Path (from the ATU-C side)
ADSL ATU-R Channel Performance Monitoring History Data	O	Performance monitoring data for an ATU-C:ATU-R modem Path (from the ATU-R side)
ADSL ATU-R Performance Monitoring History Data	O	Performance monitoring data for an ATU-C:ATU-R ADSL channel (from the ATU-R side)
Physical Path Termination Point ADSL UNI	CR	Used for the physical path termination point at an ADSL CO modem
Physical Path Termination Point VDSL UNI	CR	Used for the physical path termination point at a VDSL connection
VDSL Band Plan Configuration Profile	CR	Parameters used to configure a VDSL Band Plan Configuration Profile.
VDSL Channel Configuration Profile	CR	Parameters used to configure a VDSL Channel Configuration Profile.
VDSL Channel Data	CR	Contains the Channel Parameters for VDSL Fast and Interleaved channels.
VDSL Line Configuration Profile	CR	Parameters used to configure a VDSL Line Configuration Profile.
VDSL VTU-O Channel Performance Monitoring History Data	O	Performance monitoring data for a VDSL VTU-O channel
VDSL VTU-O Physical Data	CR	Contains the Physical Layer Parameters for a VTU-O.
VDSL VTU-O Physical Interface Monitoring History Data	O	Monitoring Data for a VDSL VTU-O Physical Interface
VDSL VTU-R Channel Performance Monitoring History Data	O	Performance monitoring data for an VDSL VTU-R channel
VDSL VTU-R Physical Data	CR	Contains the Physical Layer Parameters for a VTU-R.
VDSL VTU-R Physical Interface Monitoring History Data	O	Monitoring Data for a VDSL VTU-R Physical Interface

6.2 Managed Entity diagrams

The relationships between the required xDSL managed entities are given in Figures 2/G.omci.xdsl and 3/G.omci.xdsl.

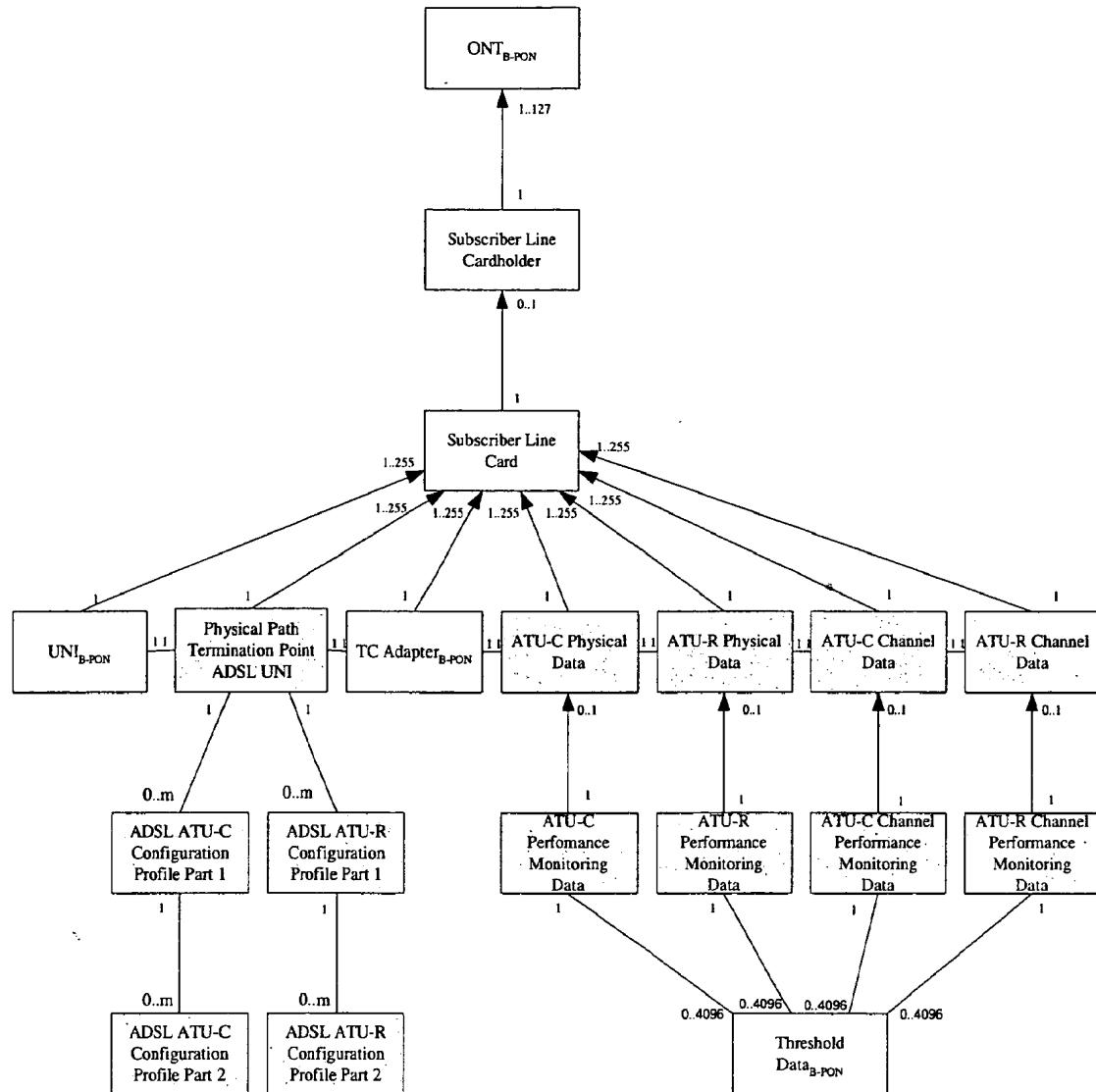


Figure 2/G.omci.xdsl Managed Entity Relation Diagram for ADSL Interfaces

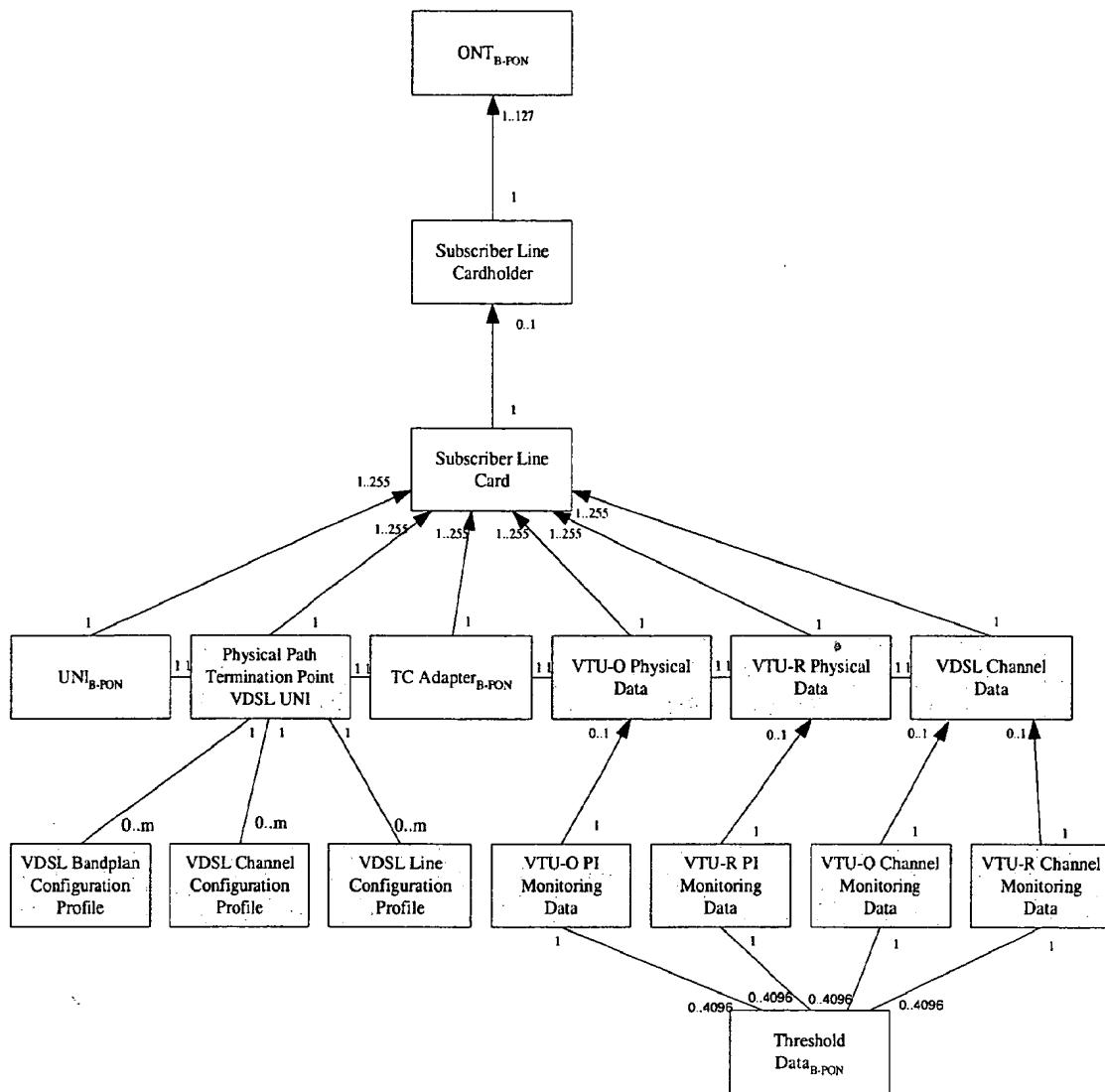


Figure 3/G.0mci.xdsl Managed Entity Relation Diagram for VDSL Interfaces

7 Modified Managed Entities

7.1 Threshold Data B-PON

Under the Relationship section, add the following Managed Entities to the existing list of PM Managed Entities:

- ADSL ATU-C Channel Performance Monitoring History Data
- ADSL ATU-C Performance Monitoring History Data
- ADSL ATU-R Channel Performance Monitoring History Data
- ADSL ATU-R Performance Monitoring History Data
- VDSL VTU-O Channel Performance History Data
- VDSL VTU-O Physical Interface Monitoring History Data
- VDSL VTU-R Channel Performance History Data
- VDSL VTU-R Physical Interface Monitoring History Data

8 New Managed Entities for xDSL management

8.1 ADSL

8.1.1 Physical Path Termination Point ADSL UNI

This managed entity represents the point at an ATM UNI in the ONT where physical paths terminate to an ADSL CO Modem.

One or more instances of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of ADSL type.

Establishment of a “Physical Path Termination Point ADSL UNI”

The Physical Path Termination Point ADSL UNI is auto created when the Subscriber Line Card of type ADSL is created. On auto creation the two profile pointers within the Managed Entity are set to their default values of 0x00. However, the PPTP ADSL UNI must refer to three valid profiles before it can be operational.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as ADSL type.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id (defined in G.983.2/Section 7.1.3). The second byte is the port id with a value range

from 0x01 to 0xFF (1 to 255): 0x01 is used for the leftmost/lowest port on a subscriber line card, 0x02 is used for the next right/upper port, and so forth. (R) (mandatory) (2 bytes)

Loopback Configuration: This attribute represents the loopback configuration of this physical interface. Value 0x00: no loopback; value 0x01: loopback2 ("Loopback2") refers to a loopback at the ONT to the OLT. The OLT can execute a physical level loopback test after loopback2 is set.). Upon autonomous instantiation, the value 0x00 is used. (R, W) (mandatory) (1 byte)

Administrative State: This attribute is used to activate (unlock: value 0x00) and deactivate (lock: value 0x01) the functions performed by instances of this managed entity. Selection of a default value for this attribute is outside the scope of this document as it is normally handled through supplier-operator negotiations. (R, W) (mandatory) (1 byte)

Operational State: This attribute indicates whether or not this managed entity is capable of performing its task. The operational state reflects the perceived ability to receive or to generate a valid signal. Valid values are enabled (0x00) and disabled (0x01). (R) (optional) (1 byte)

ADSL Line Type: This attribute indicate the ADSL line type. Valid values are:

- 1 – No channel exists
- 2 – Fast channel only exists
- 3 – Interleave channel only exists
- 4 – Either fast or interleave channel can exist, but only one at a time
- 5 – Both fast and interleave can exist

The default value for this attribute is 4 – Either fast or interleave channel can exist, but only one at a time. (R) (optional) (1 byte)

ADSL ATU-C Configuration Profile ID: This attribute provides a pointer to an instance of the ADSL ATU-C Configuration Profile Part 1 managed entity that contains the data necessary for initializing an ADSL MODEM. The value 0x00 is used to indicate that this ME does not point to an ADSL ATU-C Configuration Profile. The value 0x00 is the default value, which is set when this ME is auto created. (R, W) (mandatory) (2 bytes)

ADSL ATU-R Configuration Profile ID: This attribute provides a pointer to an instance of the ADSL ATU-R Configuration Profile Part 1 managed entity that contains the data necessary for initializing an ADSL MODEM. The value 0x00 is used to indicate that this ME does not point to an ADSL ATU-R Configuration Profile. The value 0x00 is the default value, which is set when this ME is auto created. (R, W) (mandatory) (2 bytes)

ARC: This attribute is used to control alarm reporting from this managed entity. Valid values are "off" (alarm reporting allowed immediately) and "on" (alarm reporting inhibited). Upon initial installation and provisioning of the ONT, this attribute may be set to "on" or "off" for the time interval specified by "ARCInterval." Similarly, this attribute may be set to "off". If the attribute is set to "on", then alarm reporting is inhibited until this

managed entity detects a valid signal for the time interval specified by "ARCInterval." The default value is ON. (R, W) (optional) (1 byte).

ARCInterval: This attribute provides a provisionable length of time. Units are given in minutes. The default value is 2. (R, W) (optional) (1 byte).

Actions

Get: Get one or more attributes.

Set: Set one or more attributes.

Notifications

Attribute value change: This notification is used to report autonomous changes of attributes of this managed entity. The notification shall identify the attribute and its new value. The AVCs for this managed entity are given in Table 2/G.omci.xdsI

Table 2/G.omci.xdsI - AVC list for Physical Path Termination Point ADSL UNI

Number	AVC	Description
1	N/A	
2	OpState	Operational state
3	N/A	
4	N/A	
5	N/A	
6	N/A	
7-16	Reserved	

Alarm: This notification is used to notify the management system when a failure has been detected or cleared. Both ONT and OLT should know the alarm list used by this entity. The alarms for this entity are given in Table 3/G.omci.xdsI.

Table 3/G.omci.xdsI Alarm list for Physical Path Termination Point ADSL UNI

Number	Event	Description
	Alarm	
0	NE_LOF	Near End Loss of Frame
1	NE_LOS	Near End Loss of Signal

2	NE_LOL	Near End Loss of Link
3	CARD_ALM	Card in Alarm
4	FE_LOF	Far End Loss of Frame
5	FE_LOS	Far End Loss of Signal
6	FE_LOL	Far End Loss of Link
7	FE_LPR	Far End Loss of Power

8.1.2 ADSL ATU-C Physical Data

This managed entity contains the Physical Layer Parameters for an ATU-C

One or more instances of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of ADSL type.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as ADSL type. All attributes other than Managed Entity id will default to zero,

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-C Physical Data is associated. (R) (mandatory) (2 bytes)

Serial Number: This attribute is the vendor specific string that identifies the vendor equipment. (R) (optional) (32 bytes)

Vendor ID: This attribute is a copy of the binary vendor identification code expressed as readable characters (R) (optional) (16 bytes)

Version Number: This attribute is a copy of the binary version number expressed as readable characters. (R) (optional) (16 bytes)

Service Type: This attribute is the current service type. Valid values are:

0 = none

1 = g.992.1 (g.dmt)

2 = g.992.2 (g.lite)

3 = T1.413

Current SNR Margin: This attribute is the noise margin as seen by this ATU-C with respect to its signal in tenth dB received. (R) (optional) (2 bytes)

Current Attenuation:	This attribute is the measured difference in the total power transmitted by the ATUR and the total power received by this ATUC in tenth dB. (R) (optional) (2 bytes)	
Current Status:	This attribute indicates the status of the CO ADSL Modem. Valid values are: (R)(optional)(2 Bytes)	
0	noDefect	There no defects on the line
1	lossOfFraming	ATUC failure due to not receiving valid frame.
2	lossOfSignal	ATUC failure due to not receiving signal.
3	lossOfPower	ATUC failure due to loss of power.
4	lossOfSignalQuality	Loss of Signal Quality is declared when the Noise Margin falls below the Minimum Noise margin, or the bit-error-rate exceeds 10^{-7} .
5	lossOfLink	ATUC failure due to inability to link with ATUR. This is loss of signal without ATU-R loss of power
6	dataInitFailure	ATUC failure during initialization due to bit errors corrupting startup exchange data.
7	configInitFailure	ATUC failure during initialization due to peer ATU not able to support requested configuration
8	protocolInitFailure	ATUC failure during initialization due to incompatible protocol used by the ATUR.

9 noPeerAtuPresent ATUC failure during initialization due to no activation sequence detected from peer ATU.

10 PwrThermal The ATU-C is out of service due to an abnormal power or thermal condition at the ATU-C.

Current Power Output: Measured total output power transmitted by this ATUC in tenth dBm.

This is the measurement that was reported during the last activation sequence. (R) (optional) (2 bytes)

Current Attainable Rate: This attribute indicates the maximum attainable rate by the ATUC in bits per second. This value will be greater than or equal to the current line rate. (R) (optional) (4 bytes)

Current Line Rate: This attribute indicates the current channel rate plus the overhead associated with ADSL. (R) (optional) (4 bytes)

Actions

Get: Get one or more attributes.

Notifications

None.

8.1.3 ADSL ATU-R Physical Data

This managed entity contains the Physical Layer Parameters for an ATU-R

One or more instances of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of ADSL type.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as ADSL type.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-R Physical Data is associated. (R) (mandatory) (2 bytes)

Serial Number: This attribute is the vendor specific string that identifies the vendor

equipment. (R) (optional) (32 bytes)

Vendor ID: This attribute is a copy of the binary vendor identification code expressed as readable characters (R) (optional) (16 bytes)

Version Number: This attribute is a copy of the binary version number expressed as readable characters. (R) (optional) (16 bytes)

Current SNR Margin: This attribute is the noise margin as seen by this ATUR with respect to its signal in tenth dB received. (R) (optional) (2 bytes)

Current Attenuation: This attribute is the measured difference in the total power transmitted by the ATUC and the total power received by this ATUR in tenth dB. (R) (optional) (2 bytes)

Current Status: This attribute indicates the status of the CO ADSL Modem. Valid values are: (R)(optional)(2 Bytes)

0 noDefect There no defects on the line

1 lossOfFraming ATUC failure due to not receiving valid frame.

2 lossOfSignal ATUC failure due to not receiving signal.

3 lossOfPower ATUC failure due to loss of power.

4 lossOfSignalQuality Loss of Signal Quality is declared when the Noise Margin falls below the Minimum Noise Margin, or the bit-error-rate exceeds 10^{-7} .

Current Power Output: Measured total output power transmitted by this ATUR in tenth dBm. This is the measurement that was reported during the last activation sequence. (R) (optional) (2 bytes)

Current Attainable Rate: This attribute indicates the maximum attainable rate by the ATUR in bits per second . This value will be greater than or equal to the current line rate. (R) (optional) (4 bytes)

Actions

Get: Get one or more attributes.

Notifications

None.

8.1.4 ADSL ATU-C Channel Data

This managed entity contains the Channel Parameters for an ATU-C

One or more instances of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of ADSL type.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as ADSL type.

Attributes

Managed Entity id:	This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-C Channel Data is associated. (R) (mandatory) (2 bytes)
Current Interleave Delay:	This attribute is the Interleave Delay in milliseconds for this channel. Interleave delay applies only to the interleave channel and defines the mapping (relative spacing) between subsequent input bytes at the interleaver input and their placement in the bit stream at the interleaver output. Larger numbers provide greater separation between consecutive input bytes in the output bit stream allowing for improved impulse noise immunity at the expense of payload latency. (R) (optional) (4 bytes)
Current Transmission Rate:	This attribute is the actual transmission rate in bits per second on this channel. (R) (optional) (4 bytes)
Previous Transmission Rate:	This attribute is the transmission rate in bits per second on this channel on the last initialization. (R) (optional) (4 bytes)
Current CRC Block Length:	This attribute indicates the length of the channel data-block, in bytes, on which the CRC operates. (R) (optional) (4 bytes)

Actions

Get:	Get one or more attributes.
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Notifications

None.

8.1.5 ADSL ATU-R Channel Data

This managed entity contains the Channel Parameters for an ATU-R

One or more instances of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of ADSL type.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as ADSL type.

Attributes

Managed Entity id:	This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-R Channel Data is associated. (R) (mandatory) (2 bytes)
Current Interleave Delay:	This attribute is the Interleave Delay in milliseconds for this channel. Interleave delay applies only to the interleave channel and defines the mapping (relative spacing) between subsequent input bytes at the interleaver input and their placement in the bit stream at the interleaver output. Larger numbers provide greater separation between consecutive input bytes in the output bit stream allowing for improved impulse noise immunity at the expense of payload latency. (R) (optional) (4 bytes)
Current Transmission Rate:	This attribute is the actual transmission rate in bits per second on this channel. (R) (optional) (4 bytes)
Previous Transmission Rate:	This attribute is the transmission rate in bits per second on this channel on the last initialization. (R) (optional) (4 bytes)
Current CRC Block Length:	This attribute indicates the length of the channel data-block, in bytes, on which the CRC operates. (R) (optional) (4 bytes)

Actions

Get:	Get one or more attributes.
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Notifications

None.

8.1.6 ADSL ATU-C Configuration Profile Part 1

This managed entity represents the first section of parameters needed to configure the ATU-C side of an ADSL line. An instance of this managed entity is created/deleted on request of the OLT.

Relationships

Zero or more instances of this managed entity shall exist and may be associated with zero or more instances of the Physical Path Termination Point ADSL UNI.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. The value 0x00 is reserved. (R, Set-by-create) (mandatory) (2 bytes)

ATUC Configuration Profile Part 2 ID: This attribute is the Managed Entity ID of the second section of this configuration profile. (R, Set-by-create) (mandatory) (2 bytes)

Path Type: This attribute describes which path is used. The default value for this attribute is 1 – Interleaved path. Valid values are:

- 0 – No path
- 1 – Interleaved path
- 2 – Fast path
- 3 – Fast and Interleaved path

(R, W, Set-by-create) (optional) (1 byte)

Transmission Mode: This attribute defines the transmission mode use in modem training. The valid values are:

- 0 – T1.413 or G.DMT or G.LITE
- 1 – T1.413 or G.DMT
- 2 – G.LITE
- 3 – T1.413
- 4 – G.DMT

The default value for the attribute is 0 – T1.413 or G.DMT or G.LITE (R, W, Set-by-create) (mandatory) (1 byte)

Rate Mode: This attribute defines what form of transmit rate adaptation is configured on this modem. (R, W, Set-by-create) (optional)(1 byte)

Valid values are:

- fixed (1), -- no rate adaptation
- adaptAtStartup (2), -- perform rate adaptation
only at initialization

adaptAtRuntime (3) -- perform rate adaptation at any time

Rate Change Ratio:

This attribute is the configured allocation ratio of excess transmit bandwidth between fast and interleaved channels. Only applies when two channel mode and RADSL (Rate Adaptive Asymmetric Digital Subscriber Loop) are supported. Distribute bandwidth on each channel in excess of the corresponding

Minimum Transmit Bit Rate so that:

$$\text{Rate Change Ratio} = [\text{Fast} / (\text{Fast} + \text{Interleaved})] * 100$$

In other words this value is the fast channel percentage. (R, W, Set-by-create)(optional) (1 byte)

Target Signal to Noise Ratio Margin:

This attribute is the Configured Target Signal/Noise Margin in tenth dB. This is the Noise Margin the modem must achieve with a BER of 10-7 or better to successfully complete initialization. (R, W, Set-by-create)(optional) (2 bytes)

Maximum Signal to Noise Ratio Margin:

This attribute is the configured Maximum acceptable Signal/Noise Margin in tenth dB. If the Noise Margin is above this the modem should attempt to reduce its power output to optimize its operation. (R, W, Set-by-create)(optional) (2 bytes)

Minimum Signal to Noise Ratio Margin:

This attribute is the Configured Minimum acceptable Signal/Noise Margin in tenth dB. If the noise margin falls below this level, the modem should attempt to increase its power output. If that is not possible the modem will attempt to re-initialize or shut down. (R, W, Set-by-create)(optional) (2 bytes)

Downshift Signal to Noise Ratio Margin:

This attribute is the Configured Signal/Noise Margin in tenth dB for rate downshift. If the noise margin falls below this level, the modem should attempt to decrease it's transmit rate. In the case that RADSL mode is not present, the value will be 0. (R, W, Set-by-create)(optional) (2 bytes)

Upshift Signal to Noise RatioMargin:

This attribute is the Configured Signal/Noise Margin in tenth dB for rate upshift. If the noise margin rises above this level, the modem should attempt to increase its transmit rate. In the case that RADSL is not present, the value will be '0'. (R, W, Set-by-create) (optional)(2 bytes)

Actions

Create:

Create an instance of this managed entity.

Delete:

Delete an instance of this managed entity.

Get:

Get one or more attributes.

Set:

Set one or more attributes.

Notifications

None.

8.1.7 ADSL ATU-C Configuration Profile Part 2

This managed entity represents the second set of parameters needed to configure the ATU-C side of an ADSL line. An instance of this managed entity is created/deleted on request of the OLT.

Relationships

Zero or more instances of this managed entity shall exist and may be associated with zero or more instances of the Physical Path Termination Point ADSL UNI.

Attributes

Managed Entity id:	This attribute provides a unique number for each instance of this managed entity. The value 0x00 is reserved. (R, Set-by-create) (mandatory) (2 bytes)
Minimum Upshift Time:	This attribute is the Minimum time in seconds that the current margin is above Upshift Signal to Noise Ratio before an upshift occurs. In the case that RADSL is not present, the value will be '0'. (R, W, Set-by-create) (optional)(2 bytes)
Minimum Downshift Time:	This attribute is the minimum time in seconds that the current margin is below DownshiftSnrMgn before a downshift occurs. In the case that RADSL mode is not present, the value will be '0'. (R, W, Set-by-create) (optional)(2 bytes)
Fast Path Minimum Transmit Bit Rate:	This attribute is the Configured Minimum Transmit rate for Fast channels, in bits per second. (R, W, Set-by-create) (optional)(4 bytes)
Interleave Path Minimum Transmit Bit Rate:	This attribute is the Configured Minimum Transmit rate for Interleave channels, in bits per second. (R, W, Set-by-create) (optional)(4 bytes)
Fast Path Maximum Transmit Bit Rate:	This attribute is the Configured Maximum Transmit rate for Fast channels, in bits per second. (R, W, Set-by-create) (optional)(4 bytes)
Interleave Path Maximum Transmit Bit Rate:	This attribute is the Configured Maximum Transmit rate for Interleave channels, in bits per second. (R, W, Set-by-create) (optional)(4 bytes)
Maximum Interleave Delay:	This attribute is the Configured maximum Interleave Delay for this channel in bytes. (R, W, Set-by-create) (optional)(1 byte)
Trellis Coding:	This attribute determines if Trellis coding is used in the ATC-C. Valid values are 0 no trellis coding, 1 use trellis coding. The default value for this attribute is 0 no trellis coding. R, W, Set-by-create) (optional)(1)byte
Bit Swapping:	This attribute defines the ATU-C's response to a Bit Swapping request from the AUT-R modem. Valid values are:

- 0 - OFF
- 1 - ON
- 2 - No Init
- 3 - UTC

The default value for this attribute is 0 – OFF. (R, W, Set-by-create) (optional)(1 byte)

Actions

- Create:** Create an instance of this managed entity.
- Delete:** Delete an instance of this managed entity.
- Get:** Get one or more attributes.
- Set:** Set one or more attributes.

Notifications

None.

8.1.8 ADSL ATU-R Configuration Profile Part 1

This managed entity represents the first section of parameters needed to configure the ATU-R side of an ADSL line. An instance of this managed entity is created/deleted on request of the OLT.

Relationships

Zero or more instances of this managed entity shall exist and may be associated with zero or more instances of the Physical Path Termination Point ADSL UNI.

Attributes

- Managed Entity id:** This attribute provides a unique number for each instance of this managed entity. The value 0x00 is reserved. (R, Set-by-create) (mandatory) (2 bytes)
- ATUR Configuration Profile Part 2 ID:** This attribute is the Managed Entity ID of the second section of this configuration profile. (R, Set-by-create) (mandatory) (2 bytes)
- Path Type:** This attribute describes which path is used. The default value for this attribute is 1 Interleaved path. Valid values are:

- 0 – No path
- 1 – Interleaved path
- 2 – Fast path

3 – Fast and Interleaved path

(R, W, Set-by-create) (optional) (1 byte)

Rate Mode:

This attribute defines what form of transmit rate adaptation is configured on this modem. (R, W, Set-by-create)(optional)(1 byte)

Valid values are:

fixed (1),	-- no rate adaptation
adaptAtStartup (2),	-- perform rate adaptation only at initialization
adaptAtRuntime (3)	-- perform rate adaptation at any time

Rate Change Ratio:

This attribute is the configured allocation ratio of excess transmit bandwidth between fast and interleaved channels. Only applies when two channel mode and RADSL (Rate Adaptive Asymmetric Digital Subscriber Loop) are supported. Distribute bandwidth on each channel in excess of the corresponding Minimum Transmit Bit Rate so that:

$$\text{Rate Change Ratio} = [\text{Fast} / (\text{Fast} + \text{Interleaved})] * 100$$

In other words this value is the fast channel percentage. (R, W, Set-by-create) (1 byte)

Target Signal to Noise Ratio Margin:

This attribute is the Configured Target Signal/Noise Margin in tenth dB. This is the Noise Margin the modem must achieve with a BER of 10-7 or better to successfully complete initialization. (R, W, Set-by-create)(optional)(2 bytes)

Maximum Signal to Noise Ratio Margin:

This attribute is the configured Maximum acceptable Signal/Noise Margin in tenth dB. If the Noise Margin is above this the modem should attempt to reduce its power output to optimize its operation. (R, W, Set-by-create)(optional)(2 bytes)

Minimum Signal to Noise Ratio Margin:

This attribute is the Configured Minimum acceptable Signal/Noise Margin in tenth dB. If the noise margin falls below this level, the modem should attempt to increase its power output. If that is not possible the modem will attempt to re-initialize or shut down. (R, W, Set-by-create)(optional)(2 bytes)

Actions

Create: Create an instance of this managed entity.
Delete: Delete an instance of this managed entity.
Get: Get one or more attributes.
Set: Set one or more attributes.

Notifications

None.

8.1.9 ADSL ATU-R Configuration Profile Part 2

This managed entity represents the second set of parameters needed to configure the ATU-C side of an ADSL line. An instance of this managed entity is created/deleted on request of the OLT.

Relationships

Zero or more instances of this managed entity shall exist and may be associated with zero or more instances of the Physical Path Termination Point ADSL UNI.

Attributes

Managed Entity id:	This attribute provides a unique number for each instance of this managed entity. The value 0x00 is reserved. (R, Set-by-create) (mandatory) (2 bytes)
Downshift Signal to Noise Ratio Margin:	This attribute is the Configured Signal/Noise Margin in tenth dB for rate downshift. If the noise margin falls below this level, the modem should attempt to decrease its transmit rate. In the case that RADSL mode is not present, the value will be 0. (R, W, Set-by-create)(optional) (2 bytes)
Upshift Signal to Noise RatioMargin:	This attribute is the Configured Signal/Noise Margin in tenth dB for rate upshift. If the noise margin rises above this level, the modem should attempt to increase its transmit rate. In the case that RADSL is not present, the value will be `0'. (R, W, Set-by-create) (optional) (2 bytes)
Minimum Downshift Time:	This attribute is the minimum time in seconds that the current margin is below DownshiftSnrMgn before a downshift occurs. In the case that RADSL mode is not present, the value will be `0'. (R, W, Set-by-create) (optional) (2 bytes)
Fast Path Minimum Transmit Bit Rate:	This attribute is the Configured Minimum Transmit rate for Fast channels, in bits per second. (R, W, Set-by-create) (optional) (4 bytes)
Interleave Path Minimum Transmit Bit Rate:	This attribute is the Configured Minimum Transmit rate for Interleave channels, in bits per second. (R, W, Set-by-create) (optional) (4 bytes)
Fast Path Maximum Transmit Bit Rate:	This attribute is the Configured Maximum Transmit rate for Fast channels, in bits per second. (R, W, Set-by-create) (optional) (4 bytes)
Interleave Path Maximum Transmit Bit Rate:	This attribute is the Configured Maximum Transmit rate for Interleave channels, in bits per second. (R, W, Set-by-create) (optional) (4 bytes)
Maximum Interleave Delay:	This attribute is the Configured maximum Interleave Delay for this channel in bytes. (R, W, Set-by-create) (optional) (1 byte)

Actions

Create:	Create an instance of this managed entity.
Delete:	Delete an instance of this managed entity.
Get:	Get one or more attributes.

Set: Set one or more attributes.

Notifications

None.

8.1.10 ADSL ATU-C Performance Monitoring History Data

This managed entity represents the last completed 15-minute interval collected performance monitoring of the ATUC - ATUR ADSL modem path as seen from the ATUC.

Instances of this managed entity are created/deleted by the OLT after an instance of the corresponding Physical Path Termination Point ADSL UNI managed entity is created/deleted.

Relationships

One instance of this managed entity can exist for each instance of a Physical Path Termination Point ADSL UNI.

Attributes

Managed Entity id:	This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-C Performance Monitoring History Data is associated. (R) (mandatory) (2 bytes)
Interval End Time:	This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute set equal to the number of the last completed interval. The actual counters of this managed entity start counting directly. (R) (mandatory) (1 byte)
Threshold DataB-PON id:	This attribute provides a pointer to an instance of the Threshold DataB-PON managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R, W, Set by-create) (mandatory) (2 bytes)
Loss of Frame Seconds:	This attribute is the count of seconds in the previous 15 minute interval when there was Loss of Framing. (R) (optional) (2 bytes)
Loss of Signal Seconds:	This attribute is the count of seconds in the previous 15 minute interval when there was Loss of Signal. (R) (optional) (2 bytes)
Loss of Link Seconds:	This attribute is the count of seconds in the previous 15 minute interval when there was Loss of Link. (R) (optional) (2 bytes)
Loss of Power Seconds:	This attribute is the count of seconds in the previous 15 minute interval when there was Loss of Power. (R) (optional) (2 bytes)

Errored Seconds:	This attribute is the count of Errored Seconds in the previous 15 minute interval. (R) (optional) (2 bytes)
Severely Errored Seconds:	This attribute is the count of Severely Errored Seconds in the previous 15 minute interval. (R) (optional) (2 bytes)
Line Initializations:	This attribute is the count of Line Initializations in the previous 15 minute interval. (R) (optional) (2 bytes)

Actions

Create:	Create an instance of this managed entity.
Delete:	Delete an instance of this managed entity.
Get:	Get one or more attributes.
Set:	Set one or more attributes.

Notifications

Threshold Crossing Alert:	This notification is used to notify the management system when a Threshold Crossing Alert (TCA) has been detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. The event list for this entity is given in Table 4/G.omci.xdsl.
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Table 4/G.omci.xdsl ADSL Performance Monitoring History Data

Number	Event	Description
	Threshold Crossing Alert	
0	Loss of Frame Seconds	Loss of Frame Seconds threshold crossing
1	Loss of Signal Seconds	Loss of Signal Seconds threshold crossing
2	Loss of Link Seconds	Loss of Link Seconds threshold crossing
3	Loss of Power Seconds	Loss of Power seconds threshold crossing
4	Errored Seconds	Errored seconds threshold crossing
5	Severely Errored Seconds	Severely Errored seconds threshold crossing
6	Line Initializations	Line Initializations threshold crossing

8.1.11 ADSL ATU-R Performance Monitoring History Data

This managed entity represents the last completed 15-minute interval collected performance monitoring of the ATUC - ATUR ADSL modem path as seen from the ATUR.

Instances of this managed entity are created/deleted by the OLT after an instance of the corresponding Physical Path Termination Point ADSL UNI managed entity is created/deleted.

Relationships

One instance of this managed entity can exist for each instance of a Physical Path Termination Point ADSL UNI.

Attributes

Managed Entity id:	This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-R Performance Monitoring History Data is associated. (R, Set-by-create) (mandatory) (2 bytes)
Interval End Time:	This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute set equal to the number of the last completed interval. The actual counters of this managed entity start counting directly. (R) (mandatory) (1 byte)
Threshold DataB-PON id:	This attribute provides a pointer to an instance of the Threshold DataB-PON managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R, W, Set by-create) (mandatory) (2 bytes)
Loss of Frame Seconds:	This attribute is the count of seconds in the previous 15 minute interval when there was Loss of Framing. (R) (optional) (2 bytes)
Loss of Signal Seconds:	This attribute is the count of seconds in the previous 15 minute interval when there was Loss of Signal. (R) (optional) (2 bytes)
Loss of Power Seconds:	This attribute is the count of seconds in the previous 15 minute interval when there was Loss of Power. (R) (optional) (2 bytes)
Errored Seconds:	This attribute is the count of Errored Seconds in the previous 15 minute interval. (R) (optional) (2 bytes)
Severely Errored Seconds:	This attribute is the count of Severely Errored Seconds in the previous 15 minute interval. (R) (optional) (2 bytes)

Actions

Create:	Create an instance of this managed entity.
Delete:	Delete an instance of this managed entity.
Get:	Get one or more attributes.
Set:	Set one or more attributes.

Notifications

Threshold Crossing	This notification is used to notify the management system when a
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Alert:

Threshold Crossing Alert (TCA) has been detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. The event list for this entity is given in Table 5/G.omci.xdsl.

Table 5/G.omci.xdsl ATU-R Performance Monitoring History Data

Number	Event	Description
	Threshold Crossing Alert	
0	Loss of Frame Seconds	Loss of Frame Seconds threshold crossing
1	Loss of Signal Seconds	Loss of Signal Seconds threshold crossing
2	Loss of Power Seconds	Loss of Power seconds threshold crossing
3	Errored Seconds	Errored seconds threshold crossing
4	Severely Errored Seconds	Severely Errored seconds threshold crossing

8.1.12 ADSL ATU-C Channel Performance Monitoring History Data

This managed entity represents the last completed 15-minute interval collected performance monitoring of the ATUC - ATUR ADSL channel as seen from the ATUC.

Instances of this managed entity are created/deleted by the OLT after an instance of the corresponding Physical Path Termination Point ADSL UNI managed entity is created/deleted.

Relationships

One instance of this managed entity can exist for each instance of a Physical Path Termination Point ADSL UNI.

Attributes

Managed Entity id: This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-C Channel Performance Monitoring History Data is associated. (R, Set-by-create) (mandatory) (2 bytes)

Interval End Time: This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute set equal to the number of the last completed interval. The actual counters of this managed entity start counting directly. (R) (mandatory) (1 byte)

Threshold	This attribute provides a pointer to an instance of the Threshold DataB-PON managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R, W, Set by-create) (mandatory) (2 bytes)
Corrected blocks:	This attribute is the count of all blocks received with errors that were corrected on this channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Uncorrected Blocks:	This attribute is the count of all blocks received with uncorrectable errors on this channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Transmitted Blocks:	This attribute is the count of all encoded blocks transmitted on this channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Received Blocks:	This attribute is the count of all encoded blocks received on this channel within the previous 15 minute interval. (R) (optional) (4 bytes)

Actions

Create:	Create an instance of this managed entity.
Delete:	Delete an instance of this managed entity.
Get:	Get one or more attributes.
Set:	Set one or more attributes.

Notifications

Threshold Crossing Alert:	This notification is used to notify the management system when a Threshold Crossing Alert (TCA) has been detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. The event list for this entity is given in Table 6/G.omci.xdsl.
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Table 6/G.omci.xdsl ATUC Channel Performance Monitoring History Data

Number	Event	Description
	Threshold Crossing Alert	
0	Corrected Blocks	Corrected Blocks threshold crossing
1	Uncorrected Blocks	Uncorrected Blocks threshold crossing

8.1.13 ADSL ATU-R Channel Performance Monitoring History Data

This managed entity represents the last completed 15-minute interval collected performance monitoring of the ATUC - ATUR ADSL channel as seen from the ATUR.

Instances of this managed entity are created/deleted by the OLT after an instance of the corresponding Physical Path Termination Point ADSL UNI managed entity is created/deleted.

Relationships

One instance of this managed entity can exist for each instance of a Physical Path Termination Point ADSL UNI.

Attributes

Managed Entity id:	This attribute provides a unique number for each instance of this managed entity. The assigned number is the same as the id of the Physical Path Termination Point ADSL UNI with which this ATU-R Channel Performance Monitoring History Data is associated. (R, Set-by-create) (mandatory) (2 bytes)
Interval End Time:	This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute set equal to the number of the last completed interval. The actual counters of this managed entity start counting directly. (R) (mandatory) (1 byte)
Threshold	This attribute provides a pointer to an instance of the Threshold DataB-PON managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R) (mandatory) (optional)(2 bytes)
DataB-PON id:	
Corrected blocks:	This attribute is the count of all blocks received with errors that were corrected on this channel within the previous 15 minute interval. (R)(optional) (4 bytes)
Uncorrected Blocks:	This attribute is the count of all blocks received with uncorrectable errors on this channel within the previous 15 minute interval. (R)(optional) (4 bytes)
Transmitted Blocks:	This attribute is the count of all encoded blocks transmitted on this channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Received Blocks:	This attribute is the count of all encoded blocks received on this channel within the previous 15 minute interval. (R) (optional) (4 bytes)

Actions

Create:	Create an instance of this managed entity.
Delete:	Delete an instance of this managed entity.
Get:	Get one or more attributes.
Set:	Set one or more attributes.

Notifications

Threshold Crossing	This notification is used to notify the management system when a
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Alert:

Threshold Crossing Alert (TCA) has been detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. The event list for this entity is given in Table 7/G.omci.xdsl.

Table 7/G.omci.xdsl ATU-R Channel Performance Monitoring History Data

Number	Event	Description
Threshold Crossing Alert		
0	Corrected Blocks	Corrected Blocks threshold crossing
1	Uncorrected Blocks	Uncorrected Blocks threshold crossing

8.2 VDSL

8.2.1 Physical Path Termination Point VDSL UNI

This managed entity represents the point at a VDSL connection in the ONT where physical paths terminate and physical path level functions (e.g., path overhead functions) are performed.

Instances of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of VDSL type.

If the Subscriber Line Card of VDSL type is a plug-in unit, the number of managed entities automatically created is the maximum number supportable by the Subscriber Line Card slot. This allows the creation of these managed entities before the unit is plugged-in.

Establishment of a “Physical Path Termination Point VDSL UNI”

The Physical Path Termination Point VDSL UNI is auto created when the Subscriber Line Card of type VDSL is created. On auto creation the three profile pointers within the Managed Entity are set to their default values of 0x00. However, the PPTP VDSL UNI must refer to three valid profiles before it can be operational.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as VDSL type.

Extensions for VDSL using Single Carrier Modulation (SCM) and Multiple Carrier Modulation (MCM) are for further study.

Attributes

Managed Entity id	This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id (defined in G.983.2/Section 7.1.3). The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255): 0x01 is used for the leftmost/lowest port on a subscriber line card, 0x02 is used for the next right/upper port, and so forth. (R) (mandatory) (2 bytes)
Loopback Configuration	This attribute represents the loopback configuration of this physical interface. Value 0x00: no loopback; value 0x01: loopback2 (“Loopback2” refers to a loopback at the local VDSL modem). The OLT can execute a physical level loopback test after loopback is set.). Upon autonomous instantiation, the value 0x00 is used. (R, W) (optional) (1 byte)
Administrative State	This attribute is used to activate (unlock: value 0x00) and deactivate (lock: value 0x01) the functions performed by instances of this managed entity. Selection of a default value for this attribute is outside the scope of this document as it is normally handled through supplier-operator negotiations. (R, W) (mandatory) (1 byte)
Operational State	This attribute indicates whether or not this managed entity is capable of performing its task. The operational state reflects the perceived ability to receive or to generate a valid signal. Valid values are enabled (0x00) and disabled (0x01). (R) (optional) (1 byte)
Availability State	This attribute indicates whether the hardware to support this UNI is available on the plugged in line card. Valid values are available(0) , notAvailable(1), unknown(2). (R) (optional) (1 byte)

VDSL Line Coding Type	This data type is used as the syntax for the VDSL Line Code. Attributes with this syntax identify the line coding used. The three values are: other(1) - none of the following, mcm(2) - Multiple Carrier Modulation, scm(3) - Single Carrier Modulation. (R) (optional) (1 byte)
VDSL Line Type	Defines the type of VDSL physical line entity that exists, by defining whether and how the line is channelized. If the line is channelized, the value will be other than noChannel(1). This object defines which channel type(s) are supported. Defined values are noChannel(1) - no channels exist, fastOnly(2) - only fast channel exists, interleavedOnly(3) - only interleaved channel exists, fastOrInterleaved(4) -- either fast or interleaved channel exist, but only one at a time, fastAndInterleaved(5) - both fast and interleaved channels exist. (R) (optional) (1 byte)
ARC:	This attribute is used to control alarm reporting from this managed entity. Valid values are "off" (alarm reporting allowed immediately) and "on" (alarm reporting inhibited). Upon initial installation and provisioning of the ONT, this attribute may be set to "on" or "off" for the time interval specified by "ARCInterval." Similarly, this attribute may be set to "off". If the attribute is set to "on", then alarm reporting is inhibited until this managed entity detects a valid signal for the time interval specified by "ARCInterval." The default value is ON. (R, W) (optional) (1 byte)
ARCInterval:	This attribute provides a provisonable length of time. Units are given in minutes. The default value is 2. (R, W) (optional) (1 byte)
VDSL Line Configuration Profile ID	This attribute provides a pointer to an instance of the VDSL Line Configuration Profile managed entity that contains the data necessary for initializing an VDSL MODEM. The value 0x00 is used to indicate that this ME does not point to a line configuration profile. The default value 0x00 is used when this ME is auto created. (R, W) (mandatory) (2 bytes)
VDSL Channel Configuration Profile ID	This attribute provides a pointer to an instance of the VDSL Channel Configuration Profile managed entity that contains the data necessary for channelizing a VDSL Connection. The value 0x00 is used to indicate that this ME does not point to a channel configuration profile. The default value 0x00 is used when this ME is auto created. (R, W) (mandatory) (2 bytes)
VDSL Band Plan Configuration Profile ID	This attribute provides a pointer to an instance of the VDSL Band Plan Configuration Profile managed entity that contains the data necessary to set up a VDSL Connection. The value 0x00 is used to indicate that this ME does not point to a and plan configuration profile. The default value 0x00 is used when this ME is auto created. (R, W) (mandatory) (2 bytes)
Actions	
Get	Get one or more attributes.
Set	Set one or more attributes.
Notifications	
Attribute value change:	This notification is used to report autonomous changes of attributes of this managed entity. The notification shall identify the attribute and its new value. The AVCs for this managed entity are given in Table 8/G.omci.xdsl

Table 8/G.omci.xdsl AVC list for Physical Path Termination Point VDSL UNI

Number	Attribute Value Change	Description
3	OpState	Operational state
TBD	Reserved	

Alarm: This notification is used to notify the management system when a failure has been detected or cleared. Both ONT and OLT should know the alarm list used by this entity. The alarms for this entity are given in Table 9/G.omci.xdsl.

Table 9/G.omci.xdsl Alarm list for Physical Path Termination Point VDSL UNI

Number	Alarm	Description
0	NE_LOF	Near End (VTU-O) Loss of Framing
1	NE_LOS	Near End (VTU-O) Loss of Signal
2	NE_LOP	Near End (VTU-O) Loss of Power
3	NE_LOSQ	Near End (VTU-O) Loss of Signal Quality
4	NE_LOL	Near End (VTU-O) Loss of Link
5	FE_LOF	Far End (VTU-R) Loss of Framing
6	FE_LOS	Far End (VTU-R) Loss of Signal
7	FE_LOP	Far End (VTU-R) Loss of Power
8	FE_LOSQ	Far End (VTU-R) Loss of Signal Quality
9	FE_LOL	Far End (VTU-R) Loss of Link
10	LF	Linecard Failure
11	UNAV	UNI Unavailable
12	CONFIG	Unsupported Config profile
13	OOS	Out of Service
14	SELF	Self Test Fail

8.2.2 VDSL VTU-O Physical Data

This managed entity represents the physical status of the VDSL Termination Unit (ONU) (VTU-O) in a VDSL connection in the ONT.

An instance of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of VDSL type.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as VDSL type.

Attributes

Managed Entity ID This attribute provides a unique number for each instance of this managed

entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id. The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255). (R) (mandatory) (2 bytes)

Line Transmit Rate	Indicates the current Vtu-O line transmit rate in kbps. This value will be less than or equal to the current attainable rate. Note: 1 kbps = 1000 bps. (R) (optional) (4 bytes)
Serial Number	The vendor specific string that identifies the vendor equipment. (R) (optional) (32 bytes)
Vendor ID	The vendor ID code is a copy of the binary vendor identification field expressed as readable characters in hexadecimal notation. (R) (optional) (16 bytes)
Version Number	The vendor specific version number sent by this Vtu as part of the initialization messages. It is a copy of the binary version number field expressed as readable characters in hexadecimal notation. (R) (optional) (16 bytes)
Current Status	<p>Indicates current state of the VTU-O. This is a bit-map of possible conditions. The various bit positions are</p> <ul style="list-style-type: none">0 – noDefect – There are no defects on the line.1 – lossOfFraming – VTU-O failure due to not receiving a valid frame.2 – lossOfSignal – VTU-O failure due to not receiving signal.3 – lossOfPower – VTU-O failure due to loss of power.4 – lossOfSignalQuality – Loss of Signal Quality is declared when the Noise Margin falls below the Minimum Noise Margin, or the bit-error-rate exceeds 10^{-7}.5 – lossOfLink – VTU-O failure due to inability to link with peer Vtu. Set whenever the transceiver is in the 'Warm Start' state.6 – dataInitFailure – VTU-O failure during initialization due to bit errors corrupting startup exchange data.7 – configInitFailure – VTU-O failure during initialization due to peer Vtu not able to support requested configuration.8 – protocolInitFailure – VTU-O failure during initialization due to incompatible protocol used by the peer Vtu.9 – noPeerVtuPresent – VTU-O failure during initialization due to no activation sequence detected from peer Vtu.10 – PwrThermal – The VTU-O is out of service due to an abnormal power or thermal condition.11 – outOfService – VTU-O failure due to modem service state, e.g. modem initialising, running self-test, or loading.12 – selfTestFail – VTU-O failure due to self-test failure.13 – uniUnavailable – VTU-O failure due to UNI Unavailable. (e.g. port number exceeds number available on linecard currently plugged-in)14 – configFault – VTU-O out-of-service due to inability to support the requested line configuration. (e.g. configured and plan not available on plugged-in linecard) <p>(R) (optional) (2 bytes)</p>

Current Output Power	Measured total output power transmitted by this VTU in steps of 0.1 dBm. This is the measurement that was reported during the last activation sequence. The effective range is 0 (0) to +16 (160) dBm. (R) (optional) (1 byte)
Current SNR Margin	Noise Margin as seen by this Vtu with respect to its received signal in steps of 0.25dB. The effective range is -31.75 (-127) to +31.75 (127) dB. (R) (optional) (1 byte)
Current Attenuation	Measured difference in the total power transmitted by the peer Vtu and the total power received by this Vtu. The effective range is 0 (0) to +63.75 (255) dB. (R) (optional) (1 byte)
Current Attainable Rate	Indicates the maximum currently attainable line transmit rate by the Vtu-O in kbps. This value will be equal to or greater than the current line rate. Note: 1 kbps = 1000 bps. (R) (optional) (4 bytes)

Actions

Get	Get one or more attributes.
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Notifications

None.

8.2.3 VDSL VTU-R Physical Data

This managed entity represents the physical status of the VDSL Termination Unit (Remote) (VTU-R) in a VDSL connection in the ONT.

An instance of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of VDSL type.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as VDSL type.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id. The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255). (R) (mandatory) (2 bytes)
Line Transmit Rate	Indicates the current Vtu-R line transmit rate in kbps. This value will be less than or equal to the current attainable rate. Note: 1 kbps = 1000 bps. (R) (optional) (4 bytes)
Serial Number	The vendor specific string that identifies the vendor equipment. (R) (optional) (32 bytes)
Vendor ID	The vendor ID code is a copy of the binary vendor identification field expressed as readable characters in hexadecimal notation. (R) (optional) (16 bytes)

Version Number	The vendor specific version number sent by this Vtu as part of the initialization messages. It is a copy of the binary version number field expressed as readable characters in hexadecimal notation. (R) (optional) (16 bytes)
Current Status	Indicates current state of the Vtu line. This is a bit-map of possible conditions. The various bit positions are 0 – noDefect – There are no defects on the line. 1 – lossOfFraming – Vtu failure due to not receiving a valid frame. 2 – lossOfSignal – Vtu failure due to not receiving signal. 3 – lossOfPower – Vtu failure due to loss of power. 4 – lossOfSignalQuality – Loss of Signal Quality is declared when the Noise Margin falls below the Minimum Noise Margin, or the bit-error-rate exceeds 10^{-7} . 5 – lossOfLink – Vtu failure due to inability to link with peer Vtu. Set whenever the transceiver is in the 'Warm Start' state. 6 – dataInitFailure – Vtu failure during initialization due to bit errors corrupting startup exchange data. 7 – configInitFailure – Vtu failure during initialization due to peer Vtu not able to support requested configuration. 8 – protocolInitFailure – Vtu failure during initialization due to incompatible protocol used by the peer Vtu. 9 – noPeerVtuPresent – Vtu failure during initialization due to no activation sequence detected from peer Vtu. (R) (optional) (2 bytes)
Current Output Power	Measured total output power transmitted by this VTU in steps of 0.1 dBm. This is the measurement that was reported during the last activation sequence. The effective range is 0 (0) to +16 (160) dBm. (R) (optional) (1 byte)
Current SNR Margin	Noise Margin as seen by this Vtu with respect to its received signal in 0.25dB. The effective range is -31.75 (-127) to +31.75 (127) dB. (R) (optional) (1 byte)
Current Attenuation	Measured difference in the total power transmitted by the peer Vtu and the total power received by this Vtu. The effective range is 0 (0) to +63.75 (255) dB. (R) (optional) (1 byte)
Current Attainable Rate	Indicates the maximum currently attainable line transmit rate by the Vtu-R in kbps. This value will be equal to or greater than the current line rate. Note: 1 kbps = 1000 bps. (R) (optional) (4 bytes)
Actions	
Get	Get one or more attributes.
Notifications	
None.	

8.2.4 VDSL Channel Data

This managed entity represents the physical status of the VDSL Fast and Interleaved (slow) channels in a VDSL connection in the ONT.

An instance of this managed entity shall be automatically created/deleted by the ONT upon the creation/deletion of a Subscriber Line Card of VDSL type.

Relationships

One or more instances of this managed entity shall be contained in an instance of a Subscriber Line Card managed entity classified as VDSL type.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id. The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255). (R) (mandatory) (2 bytes)
Current Interleave Delay Down	Downstream Interleave Delay for this channel in milliseconds. Interleave delay defines the mapping (relative spacing) between subsequent input bytes at the interleaver input and their placement in the bit stream at the interleaver output. Larger numbers provide greater separation between consecutive input bytes in the output bit stream allowing for improved impulse noise immunity at the expense of payload latency. (R) (optional) (1 byte)
Current Fast Payload Rate Down	Actual fast channel downstream data rate, in kbps. Note: 1 kbps = 1000 bps (R) (optional) (4 bytes)
Current Slow Payload Rate Down	Actual slow/interleaved downstream data rate, in kbps. Note: 1 kbps = 1000 bps (R) (optional) (4 bytes)
Current Fast CRC Block Length Down	Indicates the length of the downstream fast channel data-block, in bytes, on which the CRC operates. (R) (optional) (2 bytes)
Current Slow CRC Block Length Down	Indicates the length of the downstream slow channel data-block, in bytes, on which the CRC operates. (R) (optional) (2 bytes)
Current Slow Burst Protect Down	Actual level of downstream impulse noise (burst) protection, in microseconds, for the interleaved (slow) channel. (R) (optional) (2 bytes)
Current Fast FEC Down	Actual downstream Forward Error Correction (FEC) redundancy, in percent, related overhead for the fast channel. (R) (optional) (1 byte)
Current Interleave Delay Up'	Downstream Interleave Delay for this channel in milliseconds. Interleave delay applies only to the interleave (slow) channel and defines the mapping (relative spacing) between subsequent input bytes at the interleaver input and their placement in the bit stream at the interleaver output. Larger numbers provide greater separation between consecutive input bytes in the output bit stream allowing for improved impulse noise immunity at the expense of payload latency. In the case where the interface type is fast, return a value of zero. (R) (optional) (1 byte)
Current Fast Payload	Actual fast channel upstream data rate, in kbps. Note: 1 kbps = 1000 bps (R)

Rate Up	(optional) (4 bytes)
Current Slow Payload Rate Up	Actual slow/interleaved upstream data rate, in kbps. Note: 1 kbps = 1000 bps (R) (optional) (4 bytes)
Current Fast CRC Block Length Up	Indicates the length of the upstream fast channel data-block, in bytes, on which the CRC operates. (R) (optional) (2 bytes)
Current Slow CRC Block Length Up	Indicates the length of the upstream slow channel data-block, in bytes, on which the CRC operates. (R) (optional) (2 bytes)
Current Slow Burst Protect Up	Actual level of upstream impulse noise (burst) protection, in microseconds, for the interleaved (slow) channel. (R) (optional) (2 bytes)
Current Fast FEC Up	Actual upstream Forward Error Correction (FEC) redundancy, in per-cent, related overhead for the fast channel. (R) (optional) (1 byte)

Actions

Get	Get one or more attributes.
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Notifications

None.

8.2.5 VDSL Line Configuration Profile

An instance of this managed entity represents a VDSL Line Configuration Profile supported on the ONT. Zero or more VDSL Physical Path Termination Points can reference an instance of a VDSL Line Configuration Profile managed entity.

Instances of this managed entity are created and deleted by the ONT on request of the OLT.

Relationships

Zero or more instances of this managed entity shall be contained in an ONT. One or more instances of this managed entity shall be contained in an ONT containing instances of Physical Path Termination Point VDSL UNI.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. The value 0x00 is reserved. (R) (mandatory) (2 bytes)
Down Rate Mode	Specifies the rate selection behavior for the line in the downstream direction. manual(1) forces the rate to the configured rate, adaptAtInit(2) adapts the line based upon line quality. (R, W, Set-by-Create) (optional) (1 byte)
Up Rate Mode	Specifies the rate selection behavior for the line in the upstream direction. manual(1) forces the rate to the configured rate, adaptAtInit(2) adapts the line based upon line quality. (R, W, Set-by-Create) (optional) (1 byte)
Down Max Power	Specifies the maximum aggregate downstream power level in the range 0 (0) to 14.5 dBm (58) in 0.25 dBm intervals. (R, W, Set-by-Create) (optional) (1 byte)

Up Max Power	Specifies the maximum aggregate upstream power level in the range 0 (0) to 14.5 dBm (58) in 0.25 dBm intervals. (R, W, Set-by-Create) (optional) (1 byte)
Down Max SNR Margin	Specifies the maximum downstream Signal/Noise Ratio Margin in units of 0.25 dB, for a range of 0 (0) to 31.75 dB (127). (R, W, Set-by-Create) (optional) (1 byte)
Down Min SNR Margin	Specifies the minimum downstream Signal/Noise Ratio Margin in units of 0.25 dB, for a range of 0 (0) to 31.75 dB (127). (R, W, Set-by-Create) (optional) (1 byte)
Down Target SNR Margin	Specifies the target downstream Signal/Noise Ratio Margin in units of 0.25 dB, for a range of 0 (0) to 31.75 dB (127). This is the Noise Margin the transceivers must achieve with a BER of 10^{-7} or better to successfully complete initialization. (R, W, Set-by-Create) (optional) (1 byte)
Up Max SNR Margin	Specifies the maximum upstream Signal/Noise Ratio Margin in units of 0.25 dB, for a range of 0 (0) to 31.75 dB (127). (R, W, Set-by-Create) (optional) (1 byte)
Up Min SNR Margin	Specifies the minimum upstream Signal/Noise Ratio Margin in units of 0.25 dB, for a range of 0 (0) to 31.75 dB (127). (R, W, Set-by-Create) (optional) (1 byte)
Up Target SNR Margin	Specifies the target upstream Signal/Noise Ratio Margin in units of 0.25 dB, for a range of 0 (0) to 31.75 dB (127). This is the Noise Margin the transceivers must achieve with a BER of 10^{-7} or better to successfully complete initialization. (R, W, Set-by-Create) (optional) (1 byte)
Down PBO Control	Downstream power backoff (PBO) control for this line. For transceivers which do not support downstream PBO control, this object MUST be fixed at disabled(1). If auto(2) is selected, the transceiver will automatically adjust the power backoff. If manual(3) is selected, then the transceiver will use the Down PBO Level. (R, W, Set-by-Create) (optional) (1 byte)
Up PBO Control	Upstream power backoff (PBO) control for this line. For transceivers which do not support upstream PBO control, this object MUST be fixed at disabled(1). If auto(2) is selected, the transceiver will automatically adjust the power backoff. If manual(3) is selected, then the transceiver will use the Up PBO Level. (R, W, Set-by-Create) (optional) (1 byte)
Down PBO Level	Specifies the downstream backoff level to be used when Down PBO Control = manual(3). Valid range is 0 dB (0) to 40 dB (160) in 0.25 dB intervals. (R, W, Set-by-Create) (optional) (1 byte)
Up PBO Level	Specifies the upstream backoff level to be used when Up PBO Control = manual(3). Valid range is 0 dB (0) to 40 dB (160) in 0.25 dB intervals. (R, W, Set-by-Create) (optional) (1 byte)
Line Type	This parameter provisions the VDSL physical entity at start-up by defining whether and how the line will be channelized, i.e. which channel type(s) are supported. If the line is to be channelized, the value will be other than noChannel(1). Defined values are noChannel(1) - no channels exist, fastOnly(2) - only the fast channel exists, interleavedOnly(3) - only the interleaved channel exists, fastOrInterleaved(4) - either the fast or the interleaved channel exists, but only one at a time, fastAndInterleaved(5) - both fast and interleaved channels exist. (R, W, Set-by-Create) (optional) (1 byte)

Actions

Create	Create an instance of this managed entity.
Delete	Delete an instance of this managed entity.
Get	Get one or more attributes.
Set	Set one or more attributes.

Notifications

None.

8.2.6 VDSL Channel Configuration Profile

An instance of this managed entity represents a VDSL Channel Configuration Profile supported on the ONT. Zero or more VDSL Physical Path Termination Points can reference an instance of a VDSL Channel Configuration Profile managed entity.

Instances of this managed entity are created and deleted by the ONT on request of the OLT.

Relationships

Zero or more instances of this managed entity shall be contained in an ONT. One or more instances of this managed entity shall be contained in an ONT containing instances of Physical Path Termination Point VDSL UNI.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. The value 0x00 is reserved. (R, Set-by-create) (mandatory) (2 bytes)
Down Rate Ratio	For dynamic rate adaptation at startup, when the line type is set to fastAndInterleaved(5). The allocation of data rate in excess of the minimum data rate for each channel is controlled by this object, which specifies the percentage of the allocation of the excess downstream data rate to the fast channel. This allocation represents downstream Fast Channel Allocation as a percentage of total excess channel allocation. Valid range is 0 to 100. (R, W, Set-by-Create) (optional) (1 byte)
Up Rate Ratio	For dynamic rate adaptation at startup, when the line type is set to fastAndInterleaved(5). The allocation of data rate in excess of the minimum data rate for each channel is controlled by this object, which specifies the percentage of the allocation of the excess upstream data rate to the fast channel. This allocation represents upstream Fast Channel Allocation as a percentage of total excess channel allocation. Valid range is 0 to 100. (R, W, Set-by-Create) (optional) (1 byte)
Down Slow Max Data Rate	Specifies the maximum downstream slow channel data rate in steps of 64K bits/second. The maximum aggregate downstream transmit speed of the line can be derived from the sum of maximum downstream fast and slow channel data rates. (R, W, Set-by-Create) (optional) (2 bytes)

Down Slow Min Data Rate	Specifies the minimum downstream slow channel data rate in steps of 64K bits/second. The minimum aggregate downstream transmit speed of the line can be derived from the sum of minimum downstream fast and slow channel data rates. (R, W, Set-by-Create) (optional) (2 bytes)
Up Slow Max Data Rate	Specifies the maximum upstream slow channel data rate in steps of 64K bits/second. The maximum aggregate upstream transmit speed of the line can be derived from the sum of maximum upstream fast and slow channel data rates. (R, W, Set-by-Create) (optional) (2 bytes)
Up Slow Min Data Rate	Specifies the minimum upstream slow channel data rate in steps of 64K bits/second. The minimum aggregate upstream transmit speed of the line can be derived from the sum of minimum upstream fast and slow channel data rates. (R, W, Set-by-Create) (optional) (2 bytes)
Down Max Interleave Delay	Specifies the maximum interleave delay, in milliseconds, for the downstream slow channel. Valid range is 0 to 255 ms. (R, W, Set-by-Create) (optional) (1 byte)
Up Max Interleave Delay	Specifies the maximum interleave delay, in milliseconds, for the upstream slow channel. Valid range is 0 to 255 ms. (R, W, Set-by-Create) (optional) (1 byte)
Down Target Slow Burst	Specifies the target level of impulse noise (burst) protection, in microseconds, for the downstream interleaved (slow) channel. Valid range is 0 to 1275 μ s. (R, W, Set-by-Create) (optional) (2 bytes)
Up Target Slow Burst	Specifies the target level of impulse noise (burst) protection, in microseconds, for the upstream interleaved (slow) channel. Valid range is 0 to 1275 μ s. (R, W, Set-by-Create) (optional) (2 bytes)
Down Fast Max Data Rate	Specifies the maximum downstream fast channel data rate in steps of 64K bits/second. (R, W, Set-by-Create) (optional) (2 bytes)
Down Fast Min Data Rate	Specifies the minimum downstream fast channel data rate in steps of 64K bits/second. (R, W, Set-by-Create) (optional) (2 bytes)
Up Fast Max Data Rate	Specifies the maximum upstream fast channel data rate in steps of 64K bits/second. (R, W, Set-by-Create) (optional) (2 bytes)
Up Fast Min Data Rate	Specifies the minimum upstream fast channel data rate in steps of 64K bits/second. (R, W, Set-by-Create) (optional) (2 bytes)
Down Max Fast FEC	This parameter provisions the maximum level of Forward Error Correction (FEC) redundancy related overhead to be maintained, as a percentage, for the downstream fast channel. Valid range is 0 to 50 percent. (R, W, Set-by-Create) (optional) (1 byte)
Up Max Fast FEC	This parameter provisions the maximum level of Forward Error Correction (FEC) redundancy related overhead to be maintained, as a percentage, for the upstream fast channel. Valid range is 0 to 50 percent. (R, W, Set-by-Create) (optional) (1 byte)

Actions

Create	Create an instance of this managed entity.
Delete	Delete an instance of this managed entity.
Get	Get one or more attributes.
Set	Set one or more attributes.

Notifications

None.

8.2.7 VDSL Band Plan Configuration Profile

An instance of this managed entity represents a VDSL Band Plan Configuration Profile supported on the ONT. Zero or more VDSL Physical Path Termination Points can reference an instance of a VDSL Band Plan Configuration Profile managed entity.

Instances of this managed entity are created and deleted by the ONT on request of the OLT.

Relationships

Zero or more instances of this managed entity shall be contained in an ONT. One or more instances of this managed entity shall be contained in an ONT containing instances of Physical Path Termination Point VDSL UNI.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. The value 0x00 is reserved. (R, Set-by-create) (mandatory) (2 bytes)
Band Plan	The VDSL band plan to be used for the line. bandPlan997(1) is to be used for ITU-T G.993.1 Bandplan-B, ETSI Bandplan, ANSI Plan 997. bandPlan998(2) is to be used for ITU-T G.993.1 Bandplan-A, ANSI Plan 998. bandPlanFx(3) is to be used for ITU-T G.993.1 Bandplan-C. other(4) is to be used for non-standard band plans. If this object is set to bandPlanFx(3), then Band Plan FX MUST also be set. (R, W, Set-by-Create) (optional) (1 byte)
Band Plan FX	The frequency limit, in kHz, between bands D2 and U2 when the Band Plan is set to bandPlanFx(3). Valid range is 3,750 to 12,000 kHz. (R, W, Set-by-Create) (optional) (2 bytes)
Band Opt Usage	Defines the VDSL link use of the optional frequency range [25kHz - 138kHz] (Opt). unused(1) indicates Opt is unused, upstream(2) indicates Opt usage is for upstream, downstream(3) indicates Opt usage is for downstream. (R, W, Set-by-Create) (optional) (1 byte)
Up PSD Template	The upstream PSD template to be used for the line. Here, templateMask1(1) refers to a notched mask that limits the transmitted PSD within the internationally standardized HAM (Handheld Amateur Radio) radio bands, while templateMask2(2) refers to an unnotched mask. The masks themselves depend upon the applicable standard being used (Applicable Standard). (R, W, Set-by-Create) (optional) (1 byte)
Down PSD Template	The downstream PSD template to be used for the line. Here, templateMask1(1) refers to a notched mask that limits the transmitted PSD within the internationally standardized HAM (Handheld Amateur Radio) radio bands, while templateMask2(2) refers to an unnotched mask. The masks themselves depend upon the applicable standard being used (Applicable Standard). (R, W, Set-by-Create) (optional) (1 byte)

HAM Band Mask

The transmit power spectral density mask code, used to avoid interference with HAM (Handheld Amateur Radio) radio bands by introducing power control (notching) in one or more of these bands. Amateur radio band notching is defined in the VDSL spectrum as follows:

Band	Start Frequency	Stop Frequency
30m	1810 kHz	2000 kHz
40m	3500 kHz	3800 kHz (ETSI); 4000 kHz (ANSI)
80m	7000 kHz	7100 kHz (ETSI); 7300 kHz (ANSI)
160m	10100 kHz	10150 kHz

Notching for each standard band can be enabled or disabled via this bit mask. Two custom notches may be specified. If customNotch1 is enabled, then both **Custom Notch 1 Start** and **Custom Notch 1 Stop** MUST be specified. If customNotch2 is enabled, then both **Custom Notch 2 Start** and **Custom Notch 2 Stop** MUST be specified. Valid bit values are defined as follows, all combinations are allowed:

customNotch1(0) - custom (region-specific) notch
customNotch2(1) - custom (region-specific) notch
amateurBand30m(2) - amateur radio band notch
amateurBand40m(3) - amateur radio band notch
amateurBand80m(4) - amateur radio band notch
amateurBand160m(5) - amateur radio band notch

(R, W, Set-by-Create) (optional) (1 byte)

Custom Notch 1 Start

Specifies the start frequency, in kHz, of custom HAM (Handheld Amateur Radio) notch 1. This field MUST be less than or equal to **Custom Notch 1 Stop**. Valid range is 0 to 65,535 kHz. (R, W, Set-by-Create) (optional) (2 bytes)

Custom Notch 1 Stop

Specifies the stop frequency, in kHz, of custom HAM (Handheld Amateur Radio) notch 1. This field MUST be greater than or equal to **Custom Notch 1 Start**. (R, W, Set-by-Create). Valid range is 0 to 65,535 kHz. (optional) (2 bytes)

Custom Notch 2 Start

Specifies the start frequency, in kHz, of custom HAM (Handheld Amateur Radio) notch 2. This field MUST be less than or equal to **Custom Notch 2 Stop**. Valid range is 0 to 65,535 kHz. (R, W, Set-by-Create) (optional) (2 bytes)

Custom Notch 2 Stop

Specifies the stop frequency, in kHz, of custom HAM (Handheld Amateur Radio) notch 2. This field MUST be greater than or equal to **Custom Notch 2 Start**. Valid range is 0 to 65,535 kHz. (R, W, Set-by-Create) (optional) (2 bytes)

Deployment Scenario

The VDSL line deployment scenario. When using fttCab(1), the VTU-C is located in a street cabinet. When using fttEx(2), the VTU-C is located at the central office. Changes to this value will have no effect on the transceiver. (R, W, Set-by-Create) (optional) (1 byte)

ADSL Presence

Indicates presence of ADSL service in the associated cable bundle/binder.

none(1) indicates no ADSL service in the bundle, adslOverPots(2) indicates ADSL service over POTS is present in the bundle, adslOverISDN(3) indicates ADSL service over ISDN is present in the bundle. (R, W, Set-by-Create) (optional) (1 byte)

Applicable Standard The VDSL standard to be used for the line. ansi(1) indicates ANSI standard, etsi(2) indicates ETSI standard, itu(3) indicates ITU standard, other(4) indicates a standard other than the above. (R, W, Set-by-Create) (optional) (1 byte)

Actions

Create	Create an instance of this managed entity.
Delete	Delete an instance of this managed entity.
Get	Get one or more attributes.
Set	Set one or more attributes.

Notifications

None.

8.2.8 VDSL VTU-O Physical Interface Monitoring History Data

This managed entity contains the last completed 15-minute interval collected statistic data for a VDSL physical interface.

Instances of this managed entity are created/deleted by the OLT after an instance of the Physical Path Termination Point VDSL UNI managed entity is created/deleted.

The performance management of the physical interfaces used by VDSL shall be supported. Failure/notifications should include threshold alerts for unacceptable performance (error) rates. Performance data should include transmission counts of Errored Seconds (ES), Severely Errored Seconds (SES) and Unavailable Seconds (UAS).

Relationships

One instance of this managed entity can exist for each instance of the Physical Path Termination Point VDSL UNI.

Attributes

Managed Entity ID This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id. The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255). (R) (mandatory) (2 bytes)

Interval End Time: This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute is set equal to the number of the last completed interval. The actual counters of

this managed entity start counting directly. The attribute counters are updated at the end of the interval. (R) (mandatory) (1 byte)

Threshold Data_{B-PON} ID	This attribute provides a pointer to an instance of the Threshold Data _{B-PON} managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R, W, Set by-create) (mandatory) (2 bytes)
Loss of Framing Seconds	Count of seconds during this interval that there was Loss of Framing. (R) (optional) (2 bytes)
Loss of Signal Seconds	Count of seconds during this interval that there was Loss of Signal. (R) (optional) (2 bytes)
Loss of Power Seconds	Count of seconds during this interval that there was Loss of Power. (R) (optional) (2 bytes)
Loss of Link Seconds	Count of seconds during this interval that there was Loss of Link. (R) (optional) (2 bytes)
Errored Seconds	Count of Errored Seconds during this interval. An Errored Second is a one-second interval containing one or more CRC anomalies, or one or more LOS or LOF defects. (R) (optional) (2 bytes)
Severely Errored Seconds	Count of Severely Errored Seconds during this interval. (R) (optional) (2 bytes)
Unavailable Seconds	Count of Unavailable Seconds during this interval. (R) (optional) (2 bytes)
Line Initializations	Count of the line initialization attempts during this interval. This count includes both successful and failed attempts. (R) (optional) (2 bytes)

Actions

Create	Create an instance of this managed entity.
Delete	Delete an instance of this managed entity.
Get	Get one or more attributes.
Set	Set one or more attributes.

Notifications

Threshold Crossing Alert	This notification is used to notify the management system when a threshold crossing alert (TCA) is detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. Both ONT and OLT should know the event list used by this entity. The list of TCAs for this entity is given in Table 10/G.omci.xdsl.
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Table 10/G.omci.xdsl Alarm list for VDSL VTU-O Physical Interface Monitoring History Data

Number	Event	Description
	Threshold Crossing Alert	
0	LOFS	Exceeds threshold
1	LOSS	Exceeds threshold
2	LOLS	Exceeds threshold

3	LOPS	Exceeds threshold
4	ES	Exceeds threshold
5	LI	Exceeds threshold
6	SES	Exceeds threshold
7	UAS	Exceeds threshold
8-255	Reserved	

8.2.9 VDSL VTU-R Physical Interface Monitoring History Data

This managed entity contains the last completed 15-minute interval collected statistic data for a VDSL physical interface.

Instances of this managed entity are created/deleted by the OLT after an instance of the Physical Path Termination Point VDSL UNI managed entity is created/deleted.

The performance management of the physical interfaces used by VDSL shall be supported. Failure/notifications should include threshold alerts for unacceptable performance (error) rates. Performance data should include transmission counts of Errored Seconds (ES), Severely Errored Seconds (SES) and Unavailable Seconds (UAS).

Relationships

One instance of this managed entity can exist for each instance of the Physical Path Termination Point VDSL UNI.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id. The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255). (R) (mandatory) (2 bytes)
Interval End Time:	This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute is set equal to the number of the last completed interval. The actual counters of this managed entity start counting directly. The attribute counters are updated at the end of the interval. (R) (mandatory) (1 byte)
Threshold Data_{B-PO} ID	This attribute provides a pointer to an instance of the Threshold Data _{B-PO} managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R, W, Set by-create) (mandatory) (2 bytes)
Loss of Framing Seconds	Count of seconds during this interval that there was Loss of Framing. (R) (optional) (2 bytes)
Loss of Signal Seconds	Count of seconds during this interval that there was Loss of Signal. (R)

(optional) (2 bytes)

Loss of Power Seconds	Count of seconds during this interval that there was Loss of Power. (R) (optional) (2 bytes)
Loss of Link Seconds	Count of seconds during this interval that there was Loss of Link. (R) (optional) (2 bytes)
Errored Seconds	Count of Errored Seconds during this interval. An Errored Second is a one-second interval containing one or more CRC anomalies, or one or more LOS or LOF defects. (R) (optional) (2 bytes)
Severely Errored Seconds	Count of Severely Errored Seconds during this interval. (R) (optional) (2 bytes)
Unavailable Seconds	Count of Unavailable Seconds during this interval. (R) (optional) (2 bytes)
Line Initializations	Count of the line initialization attempts during this interval. This count includes both successful and failed attempts. (R) (optional) (2 bytes)

Actions

Create	Create an instance of this managed entity.
Delete	Delete an instance of this managed entity.
Get	Get one or more attributes.
Set	Set one or more attributes.

Notifications

Threshold Crossing Alert	This notification is used to notify the management system when a threshold crossing alert (TCA) is detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. Both ONT and OLT should know the event list used by this entity. The list of TCAs for this entity is given in Table 11/G.omci.xdsl.
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Table 11/G.omci.xdsl Alarm list for VDSL VTU-R Physical Interface Monitoring History Data

Number	Event	Description
	Threshold Crossing Alert	
0	LOFS	Exceeds threshold
1	LOSS	Exceeds threshold
2	LOLS	Exceeds threshold
3	LOPS	Exceeds threshold
4	ES	Exceeds threshold
5	LI	Exceeds threshold
6	SES	Exceeds threshold
7	UAS	Exceeds threshold
8-255	Reserved	

8.2.10 VDSL VTU-O Channel Performance Monitoring History Data

This managed entity contains the last completed 15-minute interval collected statistic data for both fast and interleaved VDSL channels, as seen from the VTU-O.

Instances of this managed entity are created/deleted by the OLT after an instance of the Physical Path Termination Point VDSL UNI managed entity is created/deleted.

Relationships

One instance of this managed entity can exist for each instance of the Physical Path Termination Point VDSL UNI.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id. The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255). (R) (mandatory) (2 bytes)
Interval End Time:	This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute is set equal to the number of the last completed interval. The actual counters of this managed entity start counting directly. The attribute counters are updated at the end of the interval. (R) (mandatory) (1 byte)
Threshold Data_{B-APON} ID	This attribute provides a pointer to an instance of the Threshold Data _{B-APON} managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R, W, Set by-create) (mandatory) (2 bytes)
Fast Channel Corrected Octets	This attribute is the count of all octets received by the VTU-O with errors that were corrected on the fast channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Fast Channel Bad Blocks	This attribute is the count of all blocks received by the VTU-O with uncorrectable errors on the fast channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Interleaved Channel Corrected Octets	This attribute is the count of all octets received by the VTU-O with errors that were corrected on the interleaved channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Interleaved Channel Bad Blocks	This attribute is the count of all blocks received by the VTU-O with uncorrectable errors on the interleaved channel within the previous 15 minute interval. (R) (optional) (4 bytes)

Actions

Create	Create an instance of this managed entity.
Delete	Delete an instance of this managed entity.

Get	Get one or more attributes.
Set	Set one or more attributes.
Notifications	
Threshold Crossing Alert	This notification is used to notify the management system when a threshold crossing alert (TCA) is detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. Both ONT and OLT should know the event list used by this entity. The list of TCAs for this entity is given in Table 12/G.omci.xdsl.

Table 12/G.omci.xdsl Alarm list for VDSL VTU-O Channel Performance Monitoring History Data

Number	Event	Description
	Threshold Crossing Alert	
0	FCCO	Exceeds threshold
1	FCBB	Exceeds threshold
2	ICCO	Exceeds threshold
3	ICBB	Exceeds threshold
4-255	Reserved	

8.2.11 VDSL VTU-R Channel Performance Monitoring History Data

This managed entity contains the last completed 15-minute interval collected statistic data for both fast and interleaved VDSL channels, as seen from the VTU-R.

Instances of this managed entity are created/deleted by the OLT after an instance of the Physical Path Termination Point VDSL UNI managed entity is created/deleted.

Relationships

One instance of this managed entity can exist for each instance of the Physical Path Termination Point VDSL UNI.

Attributes

Managed Entity ID	This attribute provides a unique number for each instance of this managed entity. This 2-byte number is directly associated with the physical position of the UNI. The first byte is the slot id. The second byte is the port id with a value range from 0x01 to 0xFF (1 to 255). (R) (mandatory) (2 bytes)
Interval End Time:	This attribute identifies the most recently finished 15-minute interval. It is a cyclic counter (modulo 0xFF (256)) that is incremented each time a new interval is finished and the attribute counters are updated. The value of this attribute is 0x00 during the first 15-minute interval that starts with the reception of the "synchronize time" action. The value is 0x01 during

the first period after this, and so on. If this managed entity is created after the reception of the "synchronize time" action, the value of this attribute is set equal to the number of the last completed interval. The actual counters of this managed entity start counting directly. The attribute counters are updated at the end of the interval. (R) (mandatory) (1 byte)

Threshold Data_{B-PON} ID	This attribute provides a pointer to an instance of the Threshold Data _{B-PON} managed entity that contains the threshold values for the performance monitoring data collected by this managed entity. (R, W, Set by-create) (mandatory) (2 bytes)
Fast Channel Corrected Octets	This attribute is the count of all octets received by the VTU-R with errors that were corrected on the fast channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Fast Channel Bad Blocks	This attribute is the count of all blocks received by the VTU-R with uncorrectable errors on the fast channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Interleaved Channel Corrected Octets	This attribute is the count of all octets received by the VTU-R with errors that were corrected on the interleaved channel within the previous 15 minute interval. (R) (optional) (4 bytes)
Interleaved Channel Bad Blocks	This attribute is the count of all blocks received by the VTU-R with uncorrectable errors on the interleaved channel within the previous 15 minute interval. (R) (optional) (4 bytes)

Actions

Create	Create an instance of this managed entity.
Delete	Delete an instance of this managed entity.
Get	Get one or more attributes.
Set	Set one or more attributes.

Notifications

Threshold Crossing Alert	This notification is used to notify the management system when a threshold crossing alert (TCA) is detected or cleared. The TCA change notification "on" will be sent at the crossing of the threshold by the actual counter; the TCA change notification "off" will be sent at the end of the 15 min period since that is when the actual counters are reset to 0x00. Both ONT and OLT should know the event list used by this entity. The list of TCAs for this entity is given in Table 13/G.omci.xdsl.
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Table 13/G.omci.xdsl Alarm list for VDSL VTU-O Channel Performance Monitoring History Data

Number	Event	Description
	Threshold Crossing Alert	
0	FCCO	Exceeds threshold
1	FCBB	Exceeds threshold
2	ICCO	Exceeds threshold
3	ICBB	Exceeds threshold
4-255	Reserved	

9 Managed Entity identifiers

The ONT management and control protocol cell format is defined in Recommendation G.983.2. As new managed entities are introduced into the OMCI specifications, the managed entity identifier that is used in the message identifier field shall be defined. Table 14/G.omci.xdsl gives the class values for the new managed entities. The class values for existing managed entities are found in Table 21/G.983.2.

Table 14/ G.omci.xdsl – Managed entity identifiers

Managed entity class value	Managed entity
101	Physical Path Termination Point ADSL UNI
102	ADSL ATU-C Physical Data
103	ADSL ATU-R Physical Data
104	ADSL ATU-C Channel Data
105	ADSL ATU-R Channel Data
106	ADSL ATU-C Configuration Profile Part 1
107	ADSL ATU-C Configuration Profile Part 2
108	ADSL ATU-R Configuration Profile Part 1
109	ADSL ATU-R Configuration Profile Part 2
110	ADSL ATU-C Performance Monitoring History Data
111	ADSL ATU-R Performance Monitoring History Data
112	ADSL ATU-C Channel Performance Monitoring History Data
113	ADSL ATU-R Channel Performance Monitoring History Data
114	Physical Path Termination Point VDSL UNI
115	VDSL VTU-O Physical Data
116	VDSL VTU-R Physical Data
117	VDSL Channel Data
118	VDSL Line Configuration Profile
119	VDSL Channel Configuration Profile
120	VDSL Band Plan Configuration Profile
121	VDSL VTU-O Physical Interface Monitoring History Data
122	VDSL VTU-R Physical Interface Monitoring History Data
123	VDSL VTU-O Channel Performance Monitoring History Data
124	VDSL VTU-R Channel Performance Monitoring History Data
125	VC UPC Disagreement Monitoring History Data B-PON

APPENDIX I

Bibliography

- [App.I-1] IETF RFC 2662 Definition of Managed Objects for ADSL Lines
- [App.I-2] IETF draft: Definitions of Managed Objects for Very High Speed Digital Subsctiber Lines (VDSL)
- [App.I-3] IETF draft : Definitions of Managed Object Extensions for Very High Speed Digital Subscriber Lines (VDSL) Using Single Carrier Modulation (SCM) Line Coding
- [App.I-4] IETF draft : Definitions of Managed Object Extensions for Very High Speed Digital Subscriber Lines (VDSL) Using Multiple Carrier Modulation (MCM) Line Coding